

2010 Military Health System Conference

Environmental Health Threats in Theater -- Lessons Learned

Sharing Knowledge: Achieving Breakthrough Performance

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DoD(HA)/Force Health Protection and Readiness
Programs

Overview



- The Quadruple Aim
- Key Deployment Occupational and Environmental Health (OEH) Health Drivers
 - Lessons Learned (general)
- CENTCOM Deployment OEH Threats
 - CENTCOM OEH Exposure Incidents and Lessons Learned (specific)
- Vision - Individual Longitudinal Exposure Record (LER)

Linkage of Deployment OEH to the Quadruple Aim



- Building upon OEH lessons learned and through Enhanced Knowledge Management, to improve
 - (1) **Population Health (Healthy, Fit, Protected Force)**
 - Prevention and performance optimization
 - **Medical readiness**
 - Acute/chronic and latent health effects

Linkage of Deployment OEH to the Quadruple Aim



- Building upon OEH lessons learned and Enhanced Knowledge Management, improve:
 - (2) Individual Experience of Care (Casualty Care and Health Care Quality)**
 - Acute/chronic and latent health effects
 - Long term quality of life of veterans
 - Continuity of care with/support provided by the VA

Key Deployment OEH Drivers/ Policies



- DoD(HA)/JS Policy
 - DoDD 6200.04, Force Health Protection
 - DoDI 6490.03, Deployment Health
 - Joint Staff Chairman's Memo MCM 0028-07, Procedures for Deployment Health Surveillance
- Joint Doctrine
 - JP 4.02, Health Service Support
- CENTCOM's Contingency Environmental Guidance (R200-2) has deployment health impact

Key Deployment OEH Drivers/ Policies



- 2010 NDAA, Section 317, "Prohibition on Disposing of Waste in Open-air Burn Pits"
- Service Regulations:
 - Army Regulation 11-35, Deployment OEH Risk Management
 - Air Force Medical Procedures for Deployment Health Surveillance
 - Navy Marine Corps Public Health Command, Technical Manual NEHC TM 6490.00-1 – Sep 00, Implementing Guidance for Deployment Health Surveillance

OEH Lessons Learned (General)



- LL#1.* Healthcare providers (at all levels) should be knowledgeable (**Enhanced Knowledge Management**) of expected theater OEH threats and updated on location-specific changes during deployment
- Must consider possible exposures to these threats during diagnosis and treatment in order to maintain **Readiness** and provide high quality **Casualty/Health Care**
 - Must elevate identification of unexpected/emerging health effects through the chain of command

OEH Lessons Learned



LL#2. Base Camp Health Assessments (OEH Site Assessments/**OEHSAs**) should be completed when the base camp is established

- Must include assessment of acute health risks as well as latent/chronic health risks
- Archive all OEH reports/data in the USA Public Health Command (USAPHC-Provisional; formerly USACHPPM) Deployment OEH Surveillance (DOEHS) data portals
- Be strong advocates for risk mitigation by line commanders (follow-up)

OEH Lessons Learned



- LL#3.* Healthcare providers must document confirmed/possible exposures (not environmental “conditions”) in individual medical records
- ICD-9/V coding important in theater and post- deployment
 - PDHA (Q #16) and PDHRA (Q #10) completion important in documenting self-reported exposures
 - **Facilitates any needed long-term medical follow-up/surveillance including the establishment of cohorts and registries**
 - Establishment of exposure cohorts and registries also of interest to the Congress and the VA

OEH Lessons Learned



- LL#4.* Investigate, report, and document all OEH and CBRN exposure incidents, to include rosters of personnel involved
- A line/shared responsibility between line and medical (ESOs, BEEs, etc.)
 - Ensure archiving of reports in the USAPHC DOEHS data portals
 - Facilitates any needed long-term medical follow-up/surveillance including the establishment of cohorts and registries

Deployment OEH Threats (CENTCOM)



- Infectious Disease and OEH Threats
- Burn Pit Smoke
- Al Mishraq -- Sulfur Fire Smoke
- Qarmat Ali -- Sodium Dichromate

Infectious Disease Threats



- Gastro-intestinal (food and water)
 - hepatitis, typhoid, cholera
- Leishmaniasis – dermal and visceral
- Malaria (OEF)
- Rabies
- Anthrax (naturally occurring)
- Q fever
- Influenza

Environmental Threats



- Air:
 - Particulate matter
 - Burn pit smoke emissions
 - Industrial pollution, especially when accompanied by air inversions, stagnation
 - Accidental or intentional release of CBRN or toxic industrial chemicals

Airborne Particulate Matter



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Particulate Matter Exposures



- Particulate matter (PM) – blowing sand/dust, some industrial pollutants
 - Acute/chronic-latent(?) health effects
 - Enhanced PM Study data provided to National Research Council's Committee on Toxicology Study for a health assessment
 - Reports of increased newly reported respiratory symptoms in the Millennium Cohort Study (14% vs 10% in nondeployers)
 - Some epidemiologic studies show minimal but measureable increases in asthma/bronchitis

Environmental Threats



- Water/Food Contamination:
 - If consume untreated water or food from unapproved sources, the following threats are of concern
 - Infectious diseases due primarily to fecal pathogens
 - Chemical contamination – industrial/agricultural

Environmental Threats



- Soil Contamination:
 - Hazardous wastes (host nation military bases or industrial sites)
 - Agricultural chemicals - fertilizers/pesticides

Theater Burn Pit Smoke Exposures



Theater Burn Pit Smoke Exposures



- Joint Base Balad (JBB), Iraq and many other locations
- 2008 Balad Burn Pit Health Risk Assessment
 - Findings (validated by the Defense Health Board), no long-term health effects expected, but did not consider combined exposures or elevated sensitivity in personnel
- Cancer and noncancer endpoints of concern
 - Alleged chronic health effects (in 400+ veterans); several dozen cases in service members identified with possible “inhalational cause”

Theater Burn Pit Smoke Exposures



- Cancer and noncancer risks of concern
 - Service member lawsuits lodged against burn pit contractors
 - Strong Presidential/Congressional/VA/Media interest;
 - Rep Bishop blog:
<https://sites.google.com/site/burnpits/>

Theater Burn Pit Smoke Exposures



- Theater-wide and location-specific epidemiologic studies (some utilizing the Defense Manpower Data Center's once-daily theater individual SM location reporting database) completed/ underway:
 - AFHSC, NHRC, USAPHC, USAFSAM, Military Cancer Institute
- Initial, Hypothesis-generating Studies using inpatient/outpatient data and self-report data from the Millennium Cohort Study indicate:
 - Most conditions examined did not occur more frequently in the Balad deployers.

Theater Burn Pit Smoke Exposures



- Some conditions occurred at modestly higher rates, for example: COPD and signs, symptoms and ill-defined conditions (SSIC); clinical significance unknown
- Some conflicting results
- No elevated incidence in cancers noted – surveillance on-going

Theater Burn Pit Smoke Exposures



- Risk Communication messages currently include acknowledgement:

..... that acute symptoms due to smoke exposure may occur including reddened eyes, irritated upper respiratory passages, and cough, and that a subset of SMs may be affected by longer-term health effects, possibly due combined exposures and individual susceptibilities

Theater Burn Pit Smoke Exposures



- Next Steps
 - Follow-on studies are being discussed now to explore
 - (1) Dose-response relationships,
 - (2) Health outcomes at other burn pit sites,
 - (3) Persistence (chronic nature) of diagnoses and symptoms, and
 - (4) Expanded case finding for possible case control studies

Theater Burn Pit Smoke Exposures



- Due this spring: report from the AFHSC that will incorporate results for the preliminary studies and follow-on studies
- New burn pit monitoring/sampling plan being developed for review by the Defense Health Board and implementation by CENTCOM
- At VA's request the IOM is conducting a health outcome study on OIF/OEF veterans with special emphasis on burn pit smoke exposures

Theater Burn Pit Lessons learned



- LL#5.* Advise Line Commanders on appropriate locations to site burn pits; when appropriate, elevate concerns through line/medical channels
- LL#6.* Request timely reach-back environmental health support to monitor environmental conditions and to identify any populations at risk

Ash Mishraq Sulfur Fires (2003)



Ash Mishraq Sulfur Fire Exposures



- 50-year-old sulfur plant was producing sulfuric acid; over 2,000,000 tons of processed sulfur stored on site
- June 24, 2003: accidental fire ignited and burned for approximately 3 weeks
- Smoke plume over hundreds of miles, visible on satellite imagery, contained sulfur dioxide (SO_2) and hydrogen sulfide (H_2S)
 - Extent of ground-level plume largely unknown

Ash Mishraq Sulfur Fire Exposures



- Concerns included:
 - Exposure to acid gases, heat injuries
 - Fire fighters and others
- Field sampling data (limited)
 - Acute effects of SO_2 and H_2S detected up to 25 km south

Ash Mishraq Sulfur Fire Exposures



- 42 Ft Campbell soldiers with severe exercise dyspnea referred to Vanderbilt University
 - 22 open lung biopsies and 18 dx with constrictive bronchiolitis; 1/3 boarded out of Army
 - Army EPICON report being finalized (USAPHC) – inconclusive as to whether sulfur fire smoke responsible
 - Question: what is different about these personnel, assuming they have a deployment-related medical condition – do burn pit smoke exposures play a role; synergy with other exposures /susceptibility issues?

Sulfur Fire Lessons Learned



LL#7. Ensure adequate environmental health personnel and equipment are in theater to provide mission support AND request any needed reach back support in a timely manner

- In this case, to determine extent of plume at ground level and associated concentrations of smoke constituents

Qarmat Ali – Sodium Dichromate Exposures (2003)



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Qarmat Ali Sodium Dichromate Exposures



- As many as 1350 National Guardsmen (IN, WV, SC, OR) provided security at Qarmat Ali industrial water treatment facility from April to Sept 2003
- Facility was contaminated with sodium dichromate, a source of hexavalent chromium (Cr^{+6}), a known human carcinogen
- USAPHC (then CHPPM) Special Medical Augmentation Response Team-Preventive Medicine (SMART-PM) conducted environmental and clinical assessment (Sept 2003)

Qarmat Ali Sodium Dichromate Exposures



- Summary of health effects from medical evaluations
 - Most individuals had no signs or symptoms of exposure
 - A number (25%) had non-specific findings of nasal/resp irritation or inflammation
 - Most individuals had normal chest x-ray, lab results, and PFTs
 - Total chromium blood tests did not indicate evidence of overexposure to chromium

Qarmat Ali Sodium Dichromate Exposures



- Exposures to low levels of sodium dichromate over a short period of time (most < three weeks total time on site) likely occurred
- Service member exposures to Sodium dichromate are not likely to result in long-term health effects
 - Average exposure to Soldiers was 148 hours
 - Chromium blood tests did not indicate evidence of overexposure to chromium
- Validated by Defense Health Board

Qarmat Ali Sodium Dichromate Exposures



- Current Interest/Actions
 - Congressional/VA interest/KBR employee (and some veterans) suing KBR for negligence
 - VA registry being established along with clinical workups based on self reported long-term health effects
- DoD IG investigating contractor actions and DoD/Army response and oversight
- Next steps DoD and VA to perform and analysis of reported health outcomes in cohort

Qarmat Ali Lessons Learned



LL#8. Ensure IDMT's report unusual cases to higher medical echelons if personnel are severely affected (coughing up blood)

The background features a stylized globe in shades of green and blue. Overlaid on the globe is a dark grid pattern resembling a calendar. A thermometer is also visible, positioned vertically on the right side of the globe. The text is centered over these elements.

Creation of Individual Longitudinal Exposure Records

On the horizon

Data Sources for Assembling Longitudinal Exposure Records



- Clinical Data Repository/SIDR-SADR for documentation of theater and in-garrison patient encounters
- Self-reported exposures (DD Forms 2795, 2796, 2900)
- Documentation of theater Service member daily locations (DTAS/DCAPES); data archived at Defense Manpower Data Center
- OEH surveillance documentation and archiving (OEHSAs and POEMS) in the USAPHC DOEHS data portals

Individual Deployment Longitudinal Exposure Record



SSN Search:

Electronic Health Record

Defense Manpower Data Center – individual daily location database

DOEHRS

PBCT

Sampling Data/Reports
OEHSAs & POEMSs
OEH and CBRN Incident Reports

In Garrison Locations

Deployment Location 2

Deployment Location 1

- *Deployment history*

Part A: Confirmed/Probable Exposures based on:

- *Health effects*
- *Biomonitoring*
- *Personal monitoring*
- *Proximity Modeling*

Part B: Possible Exposures

- *Deployment Health Assessments*
- *OEH/CBRN incidents*
- *Personal Blast and Contaminant Tracking System – “those at risk”*

Part C: Supplementary Ambient Monitoring Data

- *OEHSAs & POEMSs*

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Summary – “Take Homes”



- 4 General Lessons Learned:
 1. Be knowledgeable of theater and location-specific OEH threats – px, dx, tx
 2. Accomplish OEHSAs and other required OEH monitoring – ensure all OEH reports are archived at the USAPHC
 3. Document all confirmed/possible exposures in medical records – use ICD-9 and V codes
 4. Assist in investigation, reporting, documenting exposure incidents (including rosters) – archive at the USPHC

Summary – “take homes”



- 4 Specific Lessons Learned:
 - 5. Advise Line/CC on burn pit sitings and raise concerns when needed through medical/line channels
 - 6. Request timely reach back support for OEH needs (OEHSAs, POEMS, environmental monitoring, exposure characterization, etc.)
 - 7. Request/ensure adequate OEH personnel and equipment in theater
 - 8. Ensure IDMT's/echelon 1 and 2 report unusual illnesses/symptoms

Thank You



Questions?

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